I claim:

1. A moving cylinder assembly comprising:

   (a) a piston connected to a crank for reciprocal movement therewith;

   (b) a cylinder defining a chamber for receiving and engaging the piston, the cylinder adapted for reciprocal oscillating movement with the piston; and

   (c) a housing immediately embracing the cylinder and defining a slot through which the piston is positioned to allow for oscillating movement of the piston within the slot, whereby the immediate embracement of the cylinder by the housing minimizes leakage between the cylinder and the housing.

2. A cylinder assembly according to claim 1, wherein the cylinder assembly is adapted for use in an engine, compressor, pump or vacuum pump.

3. A cylinder assembly according to claim 1, wherein the cylinder is open on opposite ends for permitting the piston to approach the housing whereby dead space within the cylinder chamber is minimized.

4. A cylinder assembly according to claim 1, wherein externally provided pressure control of an interface between the cylinder and the housing minimizes leakage between the cylinder and the housing.

5. A cylinder assembly according to claim 1, wherein an interface between the cylinder and the housing is cylindrical.

6. A cylinder assembly according to claim 1, wherein an interface between the cylinder and the housing is spherical.

7. A cylinder assembly according to claim 1, wherein an end of the piston conforms to the contour of an inner surface of the housing.

8. A cylinder assembly according to claim 1, wherein the cylinder is mounted for rotational oscillation within the housing.

9. A cylinder assembly according to claim 1, wherein the cylinder is mounted for linear oscillation within the housing.

10. A cylinder assembly according to claim 1, wherein the cylinder and housing form at least one sealed cavity serving as a pneumatic spring aiding momentum reversals of the cylinder.

11. A cylinder assembly according to claim 1, wherein the housing defines at least one lubrication hole for allowing lubricant to flow into an interface between the cylinder and the housing.

12. A cylinder assembly according to claim 1, wherein the housing defines a first entrance port and a first exit port.

13. A cylinder assembly according to claim 12, further comprising means for varying the timing and the extent of the revealing of the cylinder chamber to the first entrance port and the first exit port.

14. A cylinder assembly according to claim 13, wherein the means for varying the timing and extent of the revealing of the cylinder chamber to the first entrance port and the first exit port comprises at least one timing piston operating in conjunction with a worm gear.

15. A cylinder assembly according to claim 12, wherein the cylinder defines at least a first aperture, and reciprocal movement of the piston yields oscillation of the cylinder whereby the first entrance port and first exit port are opened and closed to the cylinder chamber by intermittent alignment with the first aperture.

16. A cylinder assembly according to claim 12, wherein the first entrance port and the first exit port are crescent shaped.

17. An internal combustion engine comprising the moving cylinder assembly according to claim 15, further comprising compression means and an ignition chamber in communication with the first entrance port, and wherein the cylinder assembly

extracts mechanical power from combustion and exhausts combustion byproducts with rotation of the crankshaft.

18. A cylinder assembly according to claim 12, wherein the piston comprises a piston head connected to a piston rod connected to the crank, and the cylinder further comprises an alignment band having a hole therein for receiving the piston rod therethrough, the alignment band for maintaining alignment of the cylinder with the piston rod, and whereby movement of the piston rod and piston head imparts oscillating movement to the cylinder.

19. A cylinder according to claim 18, wherein the alignment band is shaped and positioned for sealing the slot of the housing.

20. A cylinder assembly according to claim 18, wherein the piston head is shaped for complimentary engagement with the alignment band, whereby dead space within the cylinder chamber is minimized.

21. A cylinder assembly according to claim 18, wherein the housing defines a second entrance port and a second exit port positioned proximate the crank and the slot, and further wherein the first entrance port and the first exit port are positioned distally to the crank and the slot.

22. A cylinder assembly according to claim 21, wherein the second entrance port and second exit port each comprise first and second operative segments positioned on opposite sides of the alignment band.

23. A cylinder assembly according to claim 22, wherein the cylinder and the alignment band define second and third apertures, and reciprocal movement of the piston yields oscillation of the cylinder and the first and second operative segments of the second entrance port and second exit port are opened and closed by intermittent alignment with the second and third apertures.

24. An internal combustion engine comprising the cylinder assembly according to claim 21, and further comprising compression means and first and second ignition chambers in communication with the first and second entrance ports, and wherein the cylinder assembly extracts mechanical work from combustion and exhausts combustion byproducts with rotation of the crank.

25. An apparatus for use in a combustion engine comprising:

(a) first and second cylinder assemblies, each of the first and second cylinder assemblies comprising:

(i) a piston connected to a crank for reciprocal movement therewith,

(ii) a cylinder defining a chamber for receiving and engaging the piston, the cylinder adapted for reciprocal oscillating movement with the piston, and

(iii) a housing immediately embracing the cylinder, the housing defining a first entrance port, a first exit port, and a slot through which the piston is positioned to allow for oscillating movement of the piston within the slot, whereby the immediate embracement of the cylinder by the housing minimizes leakage between the cylinder and the housing;

(b) a passage communicating with the first exit port of the first cylinder assembly and the first entrance port of the second cylinder assembly whereby compressed gases exit the first cylinder assembly and enter the second cylinder assembly with combustion; and

(c) wherein the pistons of the first and second cylinder assemblies share a similar position on at least one crankshaft to minimize distance of the passage between the first and second cylinder assemblies.

26. An apparatus according to claim 25, wherein the first and second cylinder assemblies each define a second entrance port and a second exit port, and further comprising a second passage communicating with the second exit port of the second cylinder assembly and the second entrance port of the first cylinder assembly whereby compressed gases exit the second cylinder assembly and with combustion enter the first cylinder assembly, and further wherein a power stroke on one side of the piston of the first or second cylinder assembly drives a compression stroke on another side of the piston and intake strokes on one side of the piston in the first or second cylinder assembly are paired with exhaust strokes on the other

side of the piston.

27. An apparatus according to claim 25, wherein the first and second cylinder assemblies each define a second entrance port and a second exit port, and further comprising a second passage communicating with the second exit port of the first cylinder assembly and the second entrance port of the second cylinder assembly, and whereby compressed gases exit the first cylinder assembly and with combustion enter the second cylinder assembly, and wherein intake and compression strokes occur on both sides of the piston in the first cylinder assembly and power and exhaust strokes occur on both sides of the piston in the second cylinder assembly.

28. An apparatus according to claim 25, wherein the passage communicating between the first and second cylinder assemblies is horn shaped.

29. An apparatus according to claim 25, wherein the first cylinder assembly and the second cylinder assembly are positioned in a vee arrangement.

30. An apparatus according to claim 25, wherein the second cylinder assembly is larger than the first cylinder assembly and whereby volume for the power stroke exceeds the volume for the compression stroke.

31. An apparatus according to claim 25, wherein the first cylinder assembly is brought to top dead center and bottom dead center ahead of the second cylinder assembly.